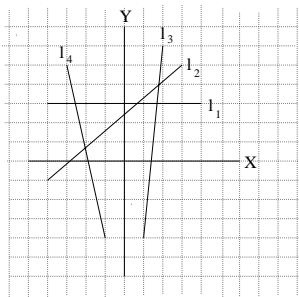


Week in Review # 3

MATH 150
2.1 through 2.8

eby-Fall 2002
drost-Fall 2002

- Find the length and midpoint of the line segment AB is $A = (s, -t)$ and $B = (3s, t)$
- Find the value of r such that the point $(3, r)$ is 8 units from the point $(-2, 3)$
- Find the center and radius of the circle:
 $2x^2 + 2y^2 - 8x + 12y + 8 = 0$
- Find the equation of the perpendicular bisector of the line segment joining $(5, -12)$ and $(-1, 2)$
- Find the equation of the circle whose diameter is AB where $A = (5, 2)$ and $B = (8, 6)$
- Find the slope through the points (r, s) and $(r + s, 4s)$, $s \neq 0$
- Given the points $P_1 = (2, 9)$, $P_2 = (5, 10)$, $P_3 = (-4, -5)$, $P_4 = (-1, -6)$
Determine if P_1P_2 and P_3P_4 are parallel, perpendicular or neither.
- Show that ABCD is a square if $A = (3, 11)$, $B = (6, 7)$, $C = (2, 4)$, $D = (-1, 8)$
- Given the following graph of lines l_1, l_2, l_3 , and l_4 . List these lines in order with increasing slopes.



- Write the equation of the line whose x-intercept is 5, and y-intercept is -2.
- Write the equation of the line whose x-intercept is -5 with a slope of $\frac{2}{3}$
- What is the equation of a vertical line passing through $(-2, 5)$?
- What is the equation of the line through $(-2, 1)$:
 - parallel to $x - 3y = 4$
 - perpendicular to $x - 3y = 4$

14. Find the domain of each of the following:

- $y = \frac{|x|}{x}$
- $y = \frac{2}{\sqrt{x^2 - 9}}$
- $y = \frac{\sqrt{x}}{x^2 - 4}$
- $y = \frac{x^2 - 3x - 4}{x^2 + 3x + 2}$

15. A jogger runs in a race for a total of 5 hrs. She runs at 6mph for t hrs and the rest of the time at 8 mph. Express the total distance d , she ran, as a function of t .

16. Given: $f(x) = x^2 - 1$, $g(x) = \frac{x - 1}{x + 2}$, and $h(x) = \sqrt{x}$

- find $f(3)$
- find $f(x + 1)$
- find $f(g(3))$ or $(f \circ g)(3)$
- find $f(g(h(4)))$ or $(f \circ g \circ h)(4)$
- find $g(f(3))$ or $(g \circ f)(3)$
- find $g\left(\frac{1}{x - 2}\right)$

17. $f(x) = \begin{cases} |x - 7|, & \text{if } x < -2 \\ x^2 + 3, & \text{if } -2 \leq x \leq 1 \\ 3x + 2, & \text{if } x > 1 \end{cases}$

- find $f(-1)$
- find $f(4)$
- find $f(0)$

18. Given $f(x) = 3x^2 - 4$, find the difference quotient

19. t is jointly proportional to x and y and inversely proportional to r . If $x = 2$, $y = 3$, and $r = 12$, then $t = 25$. Express the statement as a formula.

20. Find the average rate of change on the function $f(x) = \frac{2}{x + 1}$ from $x = 0$ to $x = h$.

21. The table shows the number of CD players sold in a small store from 1980-2000. What was the average rate of change of sales from 1984 to 1988?

Year	CD players sold
1980	412
1982	468
1984	524
1988	564
1990	582
1992	612
1994	660
1996	680
1998	742
2000	834

22. Describe the graph of: $f(x) = 2(x - 3)^2 + 5$
23. Given $g(x) = \sqrt{x}$. If the graph of $g(x)$ is shifted right one, up two, and reflected about the x-axis, what is the equation of the resulting graph?
24. Find the minimum value of $f(x) = 2x^2 + 8x + 11$
25. Find a function whose graph is a parabola with vertex $(2, -6)$ and that passes through the point $(4, -1)$
26. A rectangular box with a volume of 60 ft^3 has a square base. Find a function that models its surface area S in terms of the length x of one side of its base.
27. A bird watching society makes and sells bird feeders to raise money. The materials to make each feeder cost \$6, and they sell an average of 20/week at a price of \$10 each. They have been considering raising the price, so they conduct a survey and find that for every dollar increase they lose 2 sales per week.
- Find a function that models weekly profit in terms of x , the number of feeders.
 - What price should they charge per feeder to maximize profits.
 - What is the maximum profit?
28. Find the inverse of $f(x) = \frac{x - 2}{x + 2}$
29. Find the inverse of $g(x) = x^2$
15. $d = 40 - 2t$
16. a) 8; b) $x^2 + 2x$; c) $\frac{-21}{25}$; d) $\frac{-15}{16}$;
e) $\frac{7}{10}$; f) $\frac{3 - x}{2x - 3}$
17. a) 4; b) 14; c) 3
18. $6x + 3h$
19. $t = \frac{50xy}{r}$
20. $\frac{-2}{h + 1}$
21. 10 CD's/year
22. basis shape of $y = x^2$ stretched by a factor of 2, shifted right 3 and up 5
23. $g_1(x) = -\sqrt{x - 1} - 2$
24. 3
25. $f(x) = \frac{5}{4}(x - 2)^2 - 6$
26. $S = \frac{240}{x} + 2x^2$
27. a) $P = -.5x^2 + 14x$, b) \$13; c) \$98
28. $f^{-1}(x) = \frac{2x + 2}{1 - x}$
29. dne

ANSWERS:

- midpt = $(2s, 0)$; length = $2\sqrt{s^2 + t^2}$
- $r = 3 \pm \sqrt{39}$
- center $(2, -3)$, radius = 3
- $3x - 7y - 41 = 0$
- $(x - \frac{13}{2})^2 + (y - 4)^2 = \frac{25}{4}$
- 3
- neither
- $d_{BC} = d_{AB} = d_{CD} = d_{DA} = 5$; slopes are perpendicular
- l_4, l_1, l_2, l_3
- $y = \frac{2}{5}x - 2$
- $y = \frac{2}{3}x + \frac{10}{3}$
- $x = -2$
- a) $x - 3y + 5 = 0$; b) $3x + y + 5 = 0$
- a) $\mathcal{R}, x \neq 0$; b) $\mathcal{R}, x > 3 \cup x < -3$
c) $\mathcal{R}, x \geq 0, x \neq 2$; d) $\mathcal{R}, x \neq -2, -1$